CLAIMS

1. Process for calculation and display of mutual interference in the down direction generated in a cellular radiotelephony network with a W-CDMA type access, used with a computer system (1) comprising memory means (2) for storing data representative of network coverage maps (CN) in particular, display means, selection means (34) for selecting network cells by interactive interface means (3) and a calculation module (11), characterized in that it comprises:

- a step (50) to select a representation of a working area (6) derived from map data (CN) and covered by a set of cells, using interactive means (3) on a display device,

- a step (51) to select cells in a subset of cells (61) considered to be interfering, or a subset of cells (62) considered as being interfered, among any of the cells in the set covering the working area (6) represented using selection means (34) on display means,

- a step (52, 52') for input of threshold levels for signal / interference ratios and at least one parameter related to the power of the interfering cells (61), a parameter for a traffic channel to be studied and a parameter for a contour delimiting a calculation area in the working area (6), using the configuration means (33),

- a step (53) in which the calculation module (11) determines the geographic area served by the subset of interfered cells (61) called the service area (63) and representing this service area (63),

- a step (54) in which the calculation module estimates the overlap of each of the interfering cells (61) with the service area (63) to define and memorize an overlap area in the memory means (2),

- a step (55) in which the calculation module (11) calculates the received field level from the interfering cell (61), or the received field level from the interfered cell (62) serving the pixel considered, at each point or pixel in the overlap area (64),

- a step (55') in which the calculation module (11) calculates the interfering field which is the sum of the received fields from all interfering cells (61), at each point or pixel in the overlap area (64);

the calculation mode calculating the value $I_{0\ near}$ of the interference field created by each interfering cell for the calculation of a matrix and the sum of fields created by all interfering cells, starting from attenuation data and cell power defined as a parameter, for each pixel in the overlap area.

2. Process according to claim 1, in which a step (56) for estimating a value representing the signal / interference ratio is done for each pixel, starting from field levels and parameters.

3. Process according to claim 1, in which parameters related to the traffic channel comprise the flow in the channel, a target signal / interference ratio, and an average power per channel.

4. Process according to claim 1, in which the power of the interfering cells (61) is defined by parameters for the case with maximum interference, when the interfering cells are served by a node B (4) in the network emitting at full power.

5. Process according to claim 1, in which the power of the interfering cells (61) is defined by parameters for

the minimum interference case, with an emission limited to the common pilot channel CPICH of base stations in the network.

6. Process according to claim 1, in which the threshold levels for signal / interference ratios are functions of geomarketing data representative of a required quality of service, memorized in a memory (24) of the computer system.

7. Process according to claim 2, in which an interference matrix (31) is formed by an integration operation over the entire overlap area (64) of all results obtained for each pixel of the overlap area (64), the calculation module (11) determining the global interference ratio Tbi/j of each serving interfered cell (62) by interfering cells (61).

8. Process according to claim 1, in which the Eb/N_0 ratio of the average power of the signal to the average spectral density of the noise is calculated at each pixel in the overlap area (64) by the calculation module (11) using the following formula:

$$Eb/N_0 = Ec/I_0 + \text{spread gain},$$

where I_0 is the total value of the interference field, and where $I_0 = \Sigma\ I_{0\ near}$ + thermal noise + $I_{0\ serving}$, Ec is the value of the average power of the signal from the serving cell for the pixel, $I_{0\ serving}$ is the value of the interference field of the serving cell and the spread gain corresponds to the throughput value of the channel chosen as a parameter, the values for Ec and $I_{0\ serving}$

previously being determined by the calculation module (11) from attenuation data and the power fixed as a parameter for this cell.

9. Process according to claim 7 in which the comparison means enable the calculation module (11) to select at least three interfering cells (61) forming the cells introducing the greatest disturbance in comparison with values of the interfering matrix (31).

10. Process according to claim 8, in which a step for the display of the value of the Eb/N_0 ratio of the average power of the signal to the average spectral density of the noise is made for each pixel, for interfered cells (62) in the overlap area (64) using interactive interface means (3), the disturbance sub-areas (60) being identified by the use of a specific graphic representation for pixels of a serving interfered cell (62) for which the Eb/N_0 ratio is less than a threshold signal/interference ratio threshold defined as a parameter for the serving interfered cell (62).

11. Process according to claim 8, in which the calculation module (11) determines the Eb/N_0 or the Ec/I_0 ratio at each pixel in the overlap area (64), this ratio being compared at each pixel in the service area (63) with a threshold indicated as a parameter so as to calculate a value representative of the excess power of the interfering cell (61) for each interfering cell (61) - serving interfered cell (62) pair, this value being entered in a matrix.

12. Process according to claim 8, in which the calculation module (11) determines the Eb/N_0 or Ec/I_0

ratio at each pixel in the overlap area (64), this ratio being compared at each pixel in the service area (63) with a threshold indicated as a parameter so as to calculate a value representative of the disturbance within the interfered cell (61), for each interfered cell (61), the value of I_0 being equal to the sum of interference generated by interfering cells.

13. Process according to claim 9, in which the result of the calculated disturbance is used to make a check of the power for at least the most disturbing cell, by modification of the radiation diagram of an adaptive antenna of the cell, to increase the signal/interference ratio in this cell.

14. Computer system (1) for calculation and display of mutual interference in the down direction generated in a cellular radiotelephony network with a W-CDMA type access for implementation of the process according to claim 1, comprising memory means (2), a calculation module (11) and selection means (12), the said memory means (2) comprising data representative of geographic maps (CN), broken down into a plurality of points or pixels depending on the breakdown of the said network in a first memory (21), and data representative of a radio coverage related to the network in a second memory (22), the said system (1) being characterized in that it comprises:

- interactive interface means (3) between the user and the said system (1), connected to the selection means (12) for selecting and displaying at least one working area (6) derived from map data (CN) and covered by a set of radio coverage cells arranged according to a layout defined by the data in the second memory (22),

- configuration means (33, 34) selected by interactive means (3) to memorize a first sub-set of cells (61) to be considered as being interfering and a second sub-set of cells (62) to be considered as being interfered, in a configuration file (25) for the system (1) starting from any cells in the assembly covering the working area (6), the configuration means (33) enabling firstly the definition of threshold levels for signal/interference ratios and parameters related to the power of interfering cells (61), the traffic channel to be studied and the contour delimiting a calculation area in the working area (6), and also the memorization of these data in a configuration file (25), the calculation module (11) comprising means of determining the service area (63) served by the sub-set of the interfered cells (62), means of estimating the overlap of each interfering cell (61) with the service area (63) to define and memorize an overlap area (64) in a memory (23) in memorization means (2), and means of calculating the attenuation of the interfering cell (61), and attenuation of the serving interfered cell (62) for the pixel considered, for each point or pixel in the overlap area (64).

15. System according to claim 14, in which the calculation module (11) is connected to means (13) for extraction of data from the configuration file (25) and data representative of attenuations stored in a third memory (26) of the memorization means (2), the calculation module (11) determining a value representative of the signal/interference ratio at each pixel in the overlap area (64), starting from attenuations stored in the third memory (26) and parameters of the configuration file (25).

16. System according to claim 14 in which the interactive interface means (3) comprise means of displaying the value representative of the signal/interference ratio Eb/N_0, the average power of the signal to the average noise spectral density, and means of representing the disturbance represented by specific pixels for which the Eb/N_0 ratio is less than a threshold ratio of the signal/interference ratio input as a parameter for the serving interfered cell (62) for each serving interfered cell (61) of the sub-areas (60), and for each pixel in the overlap area (64).

17. System according to claim 14, characterized in that it comprises remote control means for controlling the power in at least one interfering cell (61) causing the greatest disturbance, by modification of the radiation diagram of an adaptive antenna of the said interfering cell (61).